

REMARKS

Claims 1-18 are pending. Claim 3 has been amended, and new claims 13-18 are added with this submission. No new matter is added. Claim 3 has been amended to clarify a typographical error in the previous response to indicate proper dependence upon claim 1, as originally filed.

I. REJECTION OF CLAIMS 1, 3 AND 6 UNDER 35 U.S.C. § 102(e)

Claims 1, 3 and 6 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,410,437 (Flanner et al.). Withdrawal of the rejection is respectfully requested for at least the following reasons.

- i. Flanner et al. neither teach nor suggest the simultaneous etching of a second trench in the second dielectric and the first trench in the first dielectric, as recited in claim 1.*

Claim 1 is directed to a method of forming a dual damascene structure. The method comprises forming a first dielectric layer, a first etch stop layer over the first dielectric layer, and a second dielectric layer over the first dielectric layer. An anti-reflective coating is formed over the second dielectric layer prior to etching a first trench. A first trench is then etched in the second dielectric layer, but this initial etch does not extend through the entirety of the first dielectric layer, as evidenced by a subsequent claimed etch of the first trench in the first dielectric. Therefore an etching of the first trench is not complete in the initial etch step. (See, e.g., Fig. 2b of applicants' application). *Then a second trench is etched in the second dielectric layer simultaneously with the remaining etching of the first trench in the underlying first dielectric layer.* Flanner et al. do not teach this feature.

As illustrated in Figs. 3-12 and described in the corresponding text (e.g., in Cols. 4-6), Flanner et al. disclose the formation of a dual damascene structure using a method different from the claimed invention. As illustrated in Figs. 3-8 of the cited

reference, a **first trench is completely patterned through both first and second dielectric layers 8, 12 prior to the formation of a second trench**. Flanner et al. call this a via etch 20. Subsequently, as illustrated in Figs. 9-12 and described in corresponding text, a second photoresist 30 is deposited, patterned and employed to form the second trench down to the etch stop layer 10. Flanner et al. call this second, separate etch the trench etch 40. Clearly then, Flanner et al. do not teach the **simultaneous etching** of the second trench in the second dielectric layer and the first trench in the first dielectric layer as claimed; **rather the first and second trenches in Flanner et al. are etched separately**.

In the Advisory Action of September 30, 2005, it states:

Applicants argue that Flanner does not disclose simultaneously etching a second trench with the etching of the first trench in the first dielectric layer. This argument is unpersuasive because as shown in Fig. 12 of Flanner, a second trench is etched in the second dielectric layer 8 simultaneously with the etching of the first trench (the first trench is previously etched in the first dielectric layer 12 as seen in Fig. 11) in the first dielectric layer 12. (A.A., 9/30/05, Continuation Sheet, Continuation of 11).

Applicants respectfully submit that Fig. 11 of Flanner et al. illustrates a **completed first trench** that extends all the way through the first dielectric layer 12 down to the barrier layer 14 **prior to the initiation of etching the second trench**. The Advisory Action even concedes that the first trench is **previously** etched in the first dielectric layer 12 with respect to the second trench etch. **Only after the first trench is completed does Flanner et al. initiate etching a second trench**. Consequently, the cited reference does not teach or suggest a simultaneous etching of the first and second trenches as recited in claim 1.

Thus the cited reference does not anticipate the invention of claim 1, and its associated depending claims 3 and 6. Accordingly, withdrawal of the rejection is respectfully requested.

II. REJECTION OF CLAIMS 2, 7-9 AND 12 UNDER 35 U.S.C. § 103(a)

Claims 2, 7-9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Flanner et al. in view of U.S. Patent No. 6,420,280 (Plat). Withdrawal of the rejection is respectfully requested for at least the following reasons.

As highlighted above, Flanner et al. does not teach the invention of claim 1. Claim 2 depends upon claim 1, and Plat does not remedy the identified deficiency in Flanner et al. Claim 7 further recites a simultaneous etching of a second trench and a first trench. For the same reasons identified above, neither Flanner et al. nor Plat either alone or in combination teach this feature. Therefore claims 7-9 and 12 are also nonobvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

III. REJECTION OF CLAIMS 4-5 UNDER 35 U.S.C. § 103(a)

Claims 4-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Flanner et al. in view of U.S. Patent No. 6,342,448 (Lin et al.). Withdrawal of the rejection is respectfully requested for at least the following reasons.

As highlighted above, Flanner et al. does not teach the invention of claim 1. Claims 4-5 depend upon claim 1, and Lin et al. do not remedy the identified deficiency in Flanner et al. Therefore for the same reasons identified above, neither Flanner et al. nor Lin et al. either alone or in combination teach this feature. Therefore claims 4-5 are also nonobvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

IV. REJECTION OF CLAIMS 10-11 UNDER 35 U.S.C. § 103(a)

Claims 10-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Flanner et al. in view of Plat, and further in view of Lin et al. Withdrawal of the rejection is respectfully requested for at least the following reasons.

As highlighted above, Flanner et al. does not teach the simultaneous etching of the second trench and the first trench, as recited in claim 7. Claims 10-11 depend upon

claim 7, and neither Plat nor Lin et al. remedy the identified deficiency in Flanner et al. Therefore for the same reasons identified above, the cited art combination does not teach this feature. Therefore claims 10-11 are also nonobvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

V. **NEW CLAIMS 13-18**

New claims 13-18 are added with this response. Such new claims are believed to be patentable over the cited art of record. Since claim 13 also includes the limitation that the first and second trenches be etched concurrently, claim 13 is patentable over the art for at least the same reasons. In addition, claim 13 recites that the etching of the first trench down to the first etch stop layer is performed concurrently with the etching of the second trench. As highlighted above, Flanner et al. complete an etch of a first trench down to a barrier layer 14 that operates as an etch stop *prior* to the initiation of the second trench etch. Therefore it is respectfully submitted that entry of the new claims does not include additional issues that require another search. Therefore entry of the new claims after the final rejection is respectfully requested.

VI. **CONCLUSION**

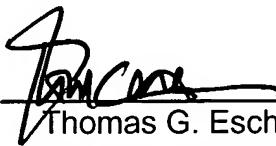
For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 20-0668, TI-31505A.

Respectfully submitted,
ESCHWEILER & ASSOCIATES, LLC

By


Thomas G. Eschweiler
Reg. No. 36,981

National City Bank Building
629 Euclid Avenue, Suite 1210
Cleveland, Ohio 44114
(216) 502-0600

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: October 12, 2005


Christine Gillroy